In the claims:

1. A network system for setting a transfer path according to a spanning tree on a network connecting a plurality of nodes, wherein

two different networks are connected by a partial network consisting of at least four nodes accommodating no terminal, and

the node belonging to said partial network

configures and manages a spanning tree for every other network adjacent to the self-partial network, according to a spanning tree protocol.

2. The network system as set forth in claim 1, where said partial network is formed by a link connecting said opposite nodes, and

each pair of the nodes for the same number as forming said partial network is connected to each different network.

3. The network system as set forth in claim 1, wherein said node comprises

a plurality of transfer units which determines an output destination port in every said partial network, based on a destination MAC address of an input frame, and

a plurality of tree managers which configures a spanning tree for every said partial network and said network, according to the spanning tree protocol and transfers a frame.

4. The network system as set forth in claim 3, wherein said node comprises

said tree manager which manages the spanning tree of the self-partial network,

a virtual port which packs into one the output ports to said self-partial network which connects said transfer unit.

5. The network system as set forth in claim 4, where said node comprises

the several transfer units which determines an output destination port in every said partial network, based on a destination MAC address of an input frame,

an RPR frame transfer unit which determines a destination RPR address, a ring ID, and an output destination port, based on the destination MAC address of the input frame,

the several tree managers which configures a spanning tree for every said partial network, according to the spanning tree protocol and transfers a frame,

a TTL manager which performs subtraction of TTL and discards the frame by the TTL, and

the virtual port which connects said tree manager for managing the spanning tree of the self-partial network and said RPR frame transfer unit and puts the output port toward the self-partial network together.

6. The network system as set forth in claim 5, wherein said TTL manager comprises

a TTL checker which discards the frame with reference to a TTL value, and

a TTL controller which performs addition and subtraction of the TTL value.

7. The network system as set forth in claim 1, wherein said node comprises

a plurality of transfer units which determines an output destination port in every said partial network, based on a destination MAC address of an input frame,

a plurality of tree managers which configures a spanning tree for every said partial network, according to the spanning tree protocol and transfers a frame, and

a BPDU identifying unit which determines a tree manager of an output destination of an input BPDU frame according to an identifier.

8. The network system as set forth in claim 7, wherein said BPDU identifying unit comprises

an identifier inserting unit which inserts a tag or a bit (tags or bits) for identifying the tree manager, and

an identifier deleting unit which deletes the tag or the bit (tags or bits) used for identifying the tree manager.

9. The network system as set forth in claim 4, wherein

said node comprises

an address learning unit which creates a table, based on an input port and a source MAC address of the received frame, and

a table which determines an output destination port by using the destination MAC address as a key.

10. The network system as set forth in claim 9, wherein said table comprises

a destination MAC address field which describes the destination MAC address, and

an output port field which describes an output destination port corresponding to the destination MAC address.

11. The network system as set forth in claim 1, wherein said node comprises

a plurality of transfer units which determines an output destination port in every said partial network, based on an identification tag of an input frame,

a multiphase tree manager which configures a spanning tree for every said partial network, according to the spanning tree protocol in every identification tag of the input frame, and

a virtual port which connects said multiphase tree manager and said transfer unit and puts the output port toward the self-partial network together.

12. The network system as set forth in claim 3, wherein said node comprises

a failure detector which detects a failure through transmission and receipt of keep alive frames.

13. The network system as set forth in claim 12, wherein said failure detector comprises

a signal separator which separats the keep alive frames from the other frame, and

a keep alive signal transmitter/receiver which transmits and receives the keep alive frames.

14. The network system as set forth in claim 12, wherein said node comprises

a frame blocking unit which cuts off the port at a time of double failure.

15. The network system as set forth in claim 1, wherein said node comprises

a plurality of transfer units which determines an output destination port in every said partial network, based on an identification tag of the input frame,

a multiphase tree manager which configures a spanning tree for every said partial network, according to the spanning tree protocol in every identification tag of the input frame, and

a tag operation unit which inserts and deletes an identification tag.

16. The network system as set forth in claim 3, wherein said tree manager comprises

a tree controller which determines a state of a port according to the spanning tree protocol,

a BPDU transmitter/receiver which transmits and receives a control signal (control signals) of the spanning tree protocol, and

a port blocking unit which closes or opens a port.

17. A node forming a spanning tree on a network connecting a plurality of nodes, comprising the following steps of:

configuring a partial network which connects two different networks by, at least, four nodes accommodating no terminal; and

configuring and managing a spanning tree for every other network adjacent to the self-partial network, according to a spanning tree protocol

18. The node as set forth in claim 17, comprising the following steps of:

configuring said partial network by a link connecting said opposite nodes; and

connecting each pair of the nodes for the same number as forming said partial network to each different network.

19. The node as set forth in claim 17, comprising:

a plurality of transfer units which determines an output destination port in every said partial network, based on a destination MAC address of an input frame; and

a plurality of tree managers which configures a spanning tree for every said network, according to the spanning tree protocol and transfers a frame.

20. The node as set forth in claim 19, comprising

said tree manager which manages the spanning tree of the self-partial network,

a virtual port which packs into one the output ports to said self-partial network which connects said transfer unit.

21. The node as set forth in claim 19, comprising:

the several transfer units which determines an output destination port in every said partial network, based on a destination MAC address of an input frame;

an RPR frame transfer unit which determines a destination RPR address, a ring ID, and an output destination port, based on the destination MAC address of the input frame;

the several tree managers which configures a spanning tree for every said partial network, according to the spanning tree protocol and transfers a frame;

a TTL manager which performs subtraction of TTL and

discards the frame by the TTL; and

the virtual port for connecting said tree manager which manages the spanning tree of the self-partial network and said RPR frame transfer unit and putting the output port toward the self-partial network together.

22. The node as set forth in claim 21, wherein said TTL manager comprises

a TTL checker which discards the frame with reference to a TTL value, and

a TTL controller which performs addition and subtraction of the TTL value.

23. The node as set forth in claim 18, comprising:

a plurality of transfer units which determines an output destination port in every said partial network, based on a destination MAC address of the input frame;

a plurality of tree managers which configures a spanning tree for every said partial network, according to the spanning tree protocol and transfers a frame; and

a BPDU identifying unit which determines a tree manager of an output destination of an input BPDU frame according to an identifier.

24. The node as set forth in claim 23, wherein said BPDU identifying unit comprises

an identifier inserting unit which inserts a tag or

a bit (tags or bits) for identifying the tree manager, and

an identifier deleting unit which deletes the tag or the bit (tags or bits) used for identifying the tree manager.

25. The node as set forth in claim 19, comprising:

an address learning unit which creates a table, based on an input port and a source MAC address of the received frame; and

a table which determines an output destination port by using the destination MAC address as a key.

26. The node as set forth in claim 25, wherein

said table comprises

a destination MAC address field which describes the destination MAC address, and

an output port field which describes an output destination port corresponding to the destination MAC address.

27. The node as set forth in claim 18, comprising:

a plurality of transfer units which determines an output destination port in every said partial network, based on an identification tag of an input frame;

a multiphase tree manager which configures a spanning tree for every said partial network, according to the spanning tree protocol in every identification tag of the input frame; and

a virtual port which connects said multiphase tree manager and said transfer unit and puts the output port toward the self-partial network together.

28. The node as set forth in claim 19, comprising

a failure detector which detectes a failure through transmission and receipt of keep alive frames.

29. The node as set forth in claim 28, wherein

said failure detector comprises

a signal separator which separates the keep alive frames from the other frame, and

a keep alive signal transmitter/receiver which transmits and receives the keep alive frames.

30. The node as set forth in claim 28, comprising

a frame blocking unit which cuts off the port at a time of double failure.

31. The node as set forth in claim 18, comprising:

a plurality of transfer units which determines an output destination port in every said partial network, based on an identification tag of the input frame;

a multiphase tree manager which configures a spanning tree for every said partial network, according to the spanning tree protocol in every identification tag of the input frame; and

a tag operation unit which inserts and deletes an identification tag.

32. The node as set forth in claim 19, wherein

said tree manager comprises

a tree controller which determines a state of a port according to the spanning tree protocol,

a BPDU transmitter/receiver which transmits and receives a control signal (control signals) of the spanning tree protocol, and

a port blocking unit which closes or opens a port.

33. A spanning tree configuration method of configuring a spanning tree on a network connecting a plurality of nodes, comprising the following steps of:

configuring a partial network which connects two different networks by, at least, four nodes accommodating no terminal; and

configuring and managing a spanning tree for every other network adjacent to the self-partial network, according to a spanning tree protocol.

34. The spanning tree configuration method as set forth in claim 33, comprising:

a transfer step of determining an output destination port in every said partial network, based on a destination MAC address of an input frame; and

a tree manager step of configuring a spanning tree for every said partial network, according to the spanning tree protocol and transferring a frame.

35. The spanning tree configuration method as set forth in claim 34, comprising

said tree manager step which manages the spanning tree of the self-partial network,

a step of connecting said transfer step by a virtual port which packs into one the output ports to said self-partial network.

36. The spanning tree configuration method as set forth in claim 34, comprising:

said transfer step of determining an output destination port in every said partial network, based on a destination MAC address of an input frame;

an RPR frame transfer step of determining a destination RPR address, a ring ID, and an output destination port, based on the destination MAC address of the input frame;

said tree manager step of configuring a spanning tree for every said partial network, according to the spanning tree protocol and transferring a frame;

a TTL manager step of performing subtraction of TTL and discarding the frame by the TTL; and

a step of connecting said tree manager step of managing the spanning tree of the self-partial network and

said RPR frame transfer step through a virtual port for putting the output port toward the self-partial network together.

37. The spanning tree configuration method as set forth in claim 34, wherein

said TTL manager step comprises

a TTL checker step of discarding the frame with reference to a TTL value, and

a TTL controller step of performing addition and subtraction of the TTL value.

38. The spanning tree configuration method as set forth in claim 35, comprising:

said transfer step of determining an output destination port in every said partial network, based on a destination MAC address of the input frame;

said tree manager step of configuring a spanning tree for every said partial network, according to the spanning tree protocol and transferring a frame; and

a BPDU identifying step of determining a tree manager step of an output destination of an input BPDU frame according to an identifier.

39. The spanning tree configuration method as set forth in claim 38, wherein

said BPDU identifying step comprises

an identifier inserting step of inserting a tag or a bit (tags or bits) for identifying said tree manager step, and

an identifier deleting step of deleting the tag or the bit (tags or bits) used for identifying said tree manager step.

40. The spanning tree configuration method as set forth in claim 34, comprising:

an address learning step of creating a table for determining an output destination port by using the destination MAC address as a key, based on an input port and a source MAC address of the received frame.

41. The spanning tree configuration method as set forth in claim 40, wherein

said table comprises

a destination MAC address field which describes the destination MAC address, and

an output port field which describes an output destination port corresponding to the destination MAC address.

42. The spanning tree configuration method as set forth in claim 33, comprising:

the transfer step of determining an output destination port in every said partial network, based on an

identification tag of an input frame;

the multiphase tree manager step of configuring a spanning tree for every said partial network, according to the spanning tree protocol in every identification tag of the input frame; and

a step of connecting said multiphase tree manager step and said transfer step through a virtual port for putting the output port toward the self-partial network together.

43. The spanning tree configuration method as set forth in claim 33, comprising

a failure detecting step of detecting a failure through transmission and receipt of keep alive frames.

44. The spanning tree configuration method as set forth in claim 43, wherein

said failure detecting step comprises

a signal separating step of separating the keep alive frames from the other frame, and

a keep alive signal transmitting/receiving step of transmitting and receiving the keep alive frames.

45. The spanning tree configuration method as set forth in claim 43, comprising

a blocking step of cutting off the port at a time of double failure.

46. The spanning tree configuration method as set forth in claim 33, comprising:

the transfer step of determining an output destination port in every said partial network, based on an identification tag of the input frame;

the multiphase tree manager step of configuring a spanning tree for every partial network, according to the spanning tree protocol in every identification tag of the input frame; and

a tag operating step of inserting and deleting an identification tag.

47. The spanning tree configuration method as set forth in claim 34, wherein

said multiphase tree manager step comprises

a tree controller step of determining a state of a port according to the spanning tree protocol,

a BPDU transmitting/receiving step of transmitting and receiving a control signal (control signals) of the spanning tree protocol, and

a port blocking step of closing or opening a port.

48. A spanning tree configuration program of running on each node forming a spanning tree on a network connecting a plurality of nodes, comprising the following functions of:

configuring a partial network which connects two different networks by, at least, four nodes accommodating

no terminal; and

configuring and managing a spanning tree for every other network adjacent to the self-partial network, according to a spanning tree protocol.

49. The spanning tree configuration program as set forth in claim 48, comprising:

a transfer function of determining an output destination port in every said partial network, based on a destination MAC address of an input frame; and

a tree manager function of configuring a spanning tree for every said partial network, according to the spanning tree protocol and transferring a frame.

50. The spanning tree configuration program as set forth in claim 49, comprising

a function of connecting said tree manager function of managing the spanning tree of the self-partial network and said transfer function through a virtual port for putting the output port toward the self-partial network together.

51. The spanning tree configuration program as set forth in claim 48, comprising:

the transfer function of determining an output destination port in every said partial network, based on a destination MAC address of an input frame;

an RPR frame transfer function of determining a

destination RPR address, a ring ID, and an output destination port, based on the destination MAC address of the input frame;

the tree manager function of configuring a spanning tree for every said partial network, according to the spanning tree protocol and transferring a frame;

a TTL manager function of performing subtraction of TTL and discarding the frame by the TTL; and

a function of connecting said tree manager function of managing the spanning tree of the self-partial network and said RPR frame transfer function through a virtual port for putting the output port toward the self-partial network together.

52. The spanning tree configuration program as set forth in claim 49, wherein

said TTL manager function comprises

a TTL checker function of discarding the frame with reference to a TTL value, and a TTL controller function of performing addition and subtraction of the TTL value.

53. The spanning tree configuration program as set forth in claim 50, comprising:

the transfer function of determining an output destination port in every said partial network, based on a destination MAC address of the input frame;

the tree manager function of configuring a spanning tree for every said partial network, according to the spanning

tree protocol and transferring a frame; and

a BPDU identifying function of determining a tree manager function of an output destination of an input BPDU frame according to an identifier.

54. The spanning tree configuration program as set forth in claim 53, wherein

said BPDU identifying function comprises

an identifier inserting function of inserting a tag or a bit (tags or bits) for identifying said tree manager function, and

an identifier deleting function of deleting the tag or the bit (tags or bits) used for identifying said tree manager function.

55. The spanning tree configuration program as set forth in claim 49, comprising

an address learning function of creating a table for determining an output destination port by using the destination MAC address as a key, based on an input port and a source MAC address of the received frame.

56. The spanning tree configuration program as set forth in claim 55, wherein

said table comprises

a destination MAC address field which describes the destination MAC address, and

an output port field which describes an output destination port corresponding to the destination MAC address.

57. The spanning tree configuration program as set forth in claim 58, comprising:

the transfer function of determining an output destination port in every partial network, based on an identification tag of an input frame;

the multiphase tree manager function of configuring a spanning tree for every partial network, according to the spanning tree protocol in every identification tag of the input frame; and

a function of connecting said multiphase tree manager function and said transfer function through a virtual port for putting the output port toward the self-partial network together.

58. The spanning tree configuration program as set forth in claim 48, comprising

a failure detecting function of detecting a failure through transmission and receipt of keep alive frames.

59. The spanning tree configuration program as set forth in claim 58, wherein

said failure detecting function comprises

a signal separating function of separating the keep

alive frames from the other frame, and

a keep alive signal transmitting/receiving function of transmitting and receiving the keep alive frames.

60. The spanning tree configuration program as set forth in claim 58, comprising

a blocking function of cutting off the port at a time of double failure.

61. The spanning tree configuration program as set forth in claim 58, comprising:

the transfer function of determining an output destination port in every said partial network, based on an identification tag of the input frame;

the multiphase tree manager function of configuring a spanning tree for every said partial network, according to the spanning tree protocol in every identification tag of the input frame; and

a tag operating function of inserting and deleting an identification tag.

62. The spanning tree configuration program as set forth in claim 59, wherein

said multiphase tree manager function comprises

a tree controller function of determining a state of a port according to the spanning tree protocol,

a BPDU transmitting/receiving function of

transmitting and receiving a control signal (control signals) of the spanning tree protocol, and

a port blocking function of closing or opening a port.

63. The network system as set forth in claim 16,

when transmitting a control signal (control signals) of said spanning tree protocol to a node adjacent to the self-node and connected to both said partial network and said other adjacent network,

transmitting the coherent MAC address of the above node as the destination of the control signal (control signals) of said spanning tree protocol.